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ABSTRACT

This paper argues that it is time to think differently about assessing the role of educational technology in the teaching and learning process. The first section addresses the question, "What is learning?" The second section examines the purpose of education. The third section discusses the knowledge base needed to apply educational technology appropriately to the teaching-learning process, including the learner-centered principles as a framework, the learner-centered psychological principles, defining "learner-centered," and using technology to provide qualities of learner-centered teachers. The fourth section considers the implications of the learner-centered framework for the application of technology to support learners and learning, the assessment of technology in service to learners and learning, building learner-centered learning communities, expanding the notion of collaboration, and transforming the educational system. An author biography is included. (Contains 49 references.) (MES)

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The Secretary's Conference on Educational Technology 2000

Assessing the Role of Educational Technology in the Teaching and Learning Process: A Learner-Centered Perspective

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For over two decades, educational technology has been used to varying degrees in our nation's schools. Numerous studies exist demonstrating that (a) educational technology appropriately applied can enhance learning and achievement compared to traditional teaching methods and (b) the benefits of educational technology cannot be adequately separated from other variables that impact learning in the larger instructional context. In spite of these findings, however, many school systems are being asked to justify the use of computer-based technologies to enhance learning in school settings (cf. McMillan-Culp, Hawkins, & Honey, 1999; McNabb, Hawkes, & Rouk, 1999). Much of the pressure to assess the benefits or "value added" by technology are the costs associated with this medium and the concern about whether teachers are being adequately trained to use technology effectively.

I would like to argue that it is time to think differently about assessing the role of educational technology in the teaching and learning process. Let me explain by addressing four fundamental questions: (1) What is learning? (2) What is the purpose of education? (3) What knowledge base is needed to apply educational technology appropriately to the teaching-learning process? and (4) What are implications of the learner-centered framework for the application and assessment of educational technology?

What is Learning?

The past century of research on learning has been a journey through a variety of theories and research that have alternately focused on behavioral, emotional, and/or cognitive aspects of learning. As we enter this new millennium, there is an increased tendency to look at learning from a more integrative and holistic perspective. Part of this impetus has been the growing recognition from various research perspectives (e.g., neurological brain research, psychological and sociological research, biological sciences research) that meaningful and sustained learning is a whole person phenomena. Learning can be reduced to a purely physiological or behavioral process, but in so doing, we reduce human phenomena to the level of lower order animals. In fact, we now know from brain research that even young children have the capacity for complex thinking (e.g., Caine & Caine, 1997; Diamond & Hopson, 1998; Jensen, 1998; Sylwester, 1995; Wolfe & Sorgen, 1990).

From my research and that of others who have explored differences in what learning looks like in and outside of school settings, several things become obvious (e.g., Kanfer & McCombs, 2000; McCombs, in press; Zimmerman & Schunk, in press). Real life learning is often characterized as playful, recursive and non-linear, engaging, self-directed, and meaningful from the learner's perspective. Motivation and learning look like the natural processes they are in real life learning - but they rarely seem so in most school settings. Why? Zimmerman (1994), for example, has argued that self-regulated learning is, by definition, only possible in contexts that provide for choice and control. If students do not have options to choose among or if they are not allowed to control critical dimensions of their learning (such as what topics to pursue, how and when to study, and the outcomes they want to achieve), regulation of thinking and learning processes by the self is not fully possible. Externally imposed conditions then regulate the content, structure, and process of learning.

The important point is that in too many school experiences, the learning process is rote, surface, and/or low level. Many students are complying with mandated learning demands to master a growing number of standards and benchmarks - they are going through the motions but becoming increasingly alienated and frustrated in the process. Too many students complain that school is boring, that what they are learning is irrelevant, and that teachers don't care or seem angry and stressed out (McCombs & Whisler, 1997). Is this what we want or what we intend as the purpose of education?

What is the Purpose of Education?

Within a person-centered view (e.g., Combs, 1962, 1986), schools are concerned with creating the kinds of experiences that will produce productive, healthy people. Consistent with this view, Fullan (2000) has argued that the purpose of education is to build learning communities - communities that bring moral purpose back into teaching and reconnect teachers with their fundamental purpose as making a difference in young people's lives and changing the quality of relationships throughout the system. For Thornburg (1999), the purpose of education is shifting due to the exponential growth in access to information in the past 50 years. He believes that education now needs to foster lifelong learners, to transform the value we place on what we already know, and to create new networks for dialog, reflection, and contextual applications of learning in the real world.

In this context, we need educational models that reconnect learners with others and with learning - models that are person-centered while also addressing needs for challenging learning experiences. Learning experiences in school should prepare learners to be knowledge producers, knowledge users, and socially responsible citizens. Of course, we want students to learn socially valued knowledge and skills, but is that sufficient? Again, as Thornburg (1999) has argued, we must move beyond the past where information was seen as a scarce resource and education was a system for imparting information to benefit learners. Now content is abundant and not a good foundation for basing an educational system; rather, context and meaning are the scare commodities today. The new purpose of education is that of helping learners communicate with others, find relevant and accurate information for the task at hand, and be co-learners with teachers in diverse settings that go beyond school walls.

To move toward this vision will require new concepts defining the learning process and the evolving purpose of education. It will also require rethinking current directions and practices. For example, we need to examine current reform efforts that center on the standards movement, which identifies important content and skills. While maintaining high standards of learning, we must not neglect the learning environment and the learning process. The focus must be expanded to include the goals of knowledge conservation, and move toward those focusing on knowledge creation and production (Carroll, 2000; Hannafin, 1999).

From a person- or learner-centered view, the current focus on content must be balanced with a focus on individual learners and their learning needs in an increasingly complex and fast changing world. This balance is essential if we are to adequately prepare students for productive and healthy futures. It is also an appropriate response to students' reports that school is irrelevant, that they feel disconnected from their teachers and peers, or that they just don't want to be in school when they can be learning outside of school - from real life experiences or from technologies such as the Internet. To guide the process of transforming education and to inform educators on how best to apply educational technology in the teaching and learning process, however, a knowledge base is needed. This knowledge base should be one built upon research-validated principles of learning and change in complex human living systems such as education.

What Knowledge Base is Needed to Apply Educational Technology Appropriately to the Teaching and Learning Process?

Research confirms that a focus on personal and motivational outcomes balanced with a focus on high achievement and challenging standards is vital in today's schools if we are to address current concerns about increasing student achievement and preparing students for the future. It is also essential in reducing negative trends such as school dropout, peer bullying, and violence. There is growing recognition that schooling must prepare children to behave in moral and ethical ways. For example, many educators are calling for caring, democratic schooling and instructional methods that build on each student's backgrounds, experiences of reality, and perspectives (e.g., Bartolome, 1994; McWhorter, Jarrard, Rhoades, & Wiltcher, 1996; Noddings, 1995; Ruddick, Day, & Wallace, 1997) - practices that address the personal domain of educational systems.

For practices such as these to become realities, however, we need research-validated principles to guide the design, including the design of effective uses of educational technology to support learners and enhance learning. When the knowledge base on principles of learners and learning is understood, it becomes clear that there must be a focus on human needs and teacher/student relationships. Students must be seen as knowledge generators and active participants in their own learning. When power is shared by students and teachers, teaching technologies are a means to an end rather than an end in themselves.

The Learner-Centered Principles as a Framework

Education is one of many complex living systems that function to support particular human needs (cf. Wheatley, 1999). Such systems are by their nature unpredictable but can be understood in terms of principles that define human needs, cognitive and motivational processes, development and individual differences. The research-validated Learner Centered Psychological Principles (APA, 1993, 1997) provide a knowledge base for understanding learning and motivation as natural processes that occur when the conditions and context of learning are supportive of individual learner needs, capacities, experiences, and interests. Attention to this knowledge base about learners and learning is central to defining the personal domain of educational systems. This domain focuses on the human processes and on personal and interpersonal relationships, beliefs, and perceptions that are affected by and/or supported by the educational system as a whole. The foundation of the research-validated learner-centered principles is essential to designing technology-supported practices that attend holistically and systemically to the needs of all learners.

The Learner-Centered Psychological Principles

Beginning in 1990, the American Psychological Association (APA) appointed a special Task Force on Psychology in Education, one of whose purposes was to integrate research and theory from psychology and education in order to surface general principles that have stood the test of time and can provide a framework for school redesign and reform. The result was a document that originally specified twelve fundamental principles about learners and learning that, taken together, provide an integrated perspective on factors influencing learning for all learners (APA, 1993). This document was revised in 1997 (APA, 1997) and now includes 14 principles that are essentially the same as the original 12 principles with the exception that attention is now given to principles dealing with diversity and standards. [Note to readers: For those interested in research support for the Principles, several sources are relevant. The specific research and theory that was reviewed in developing the Principles is described in McCombs and Whisler (1997). Further research support is also provided in Alexander and Murphy (1998) and Lambert and McCombs (1998)].

The 14 learner-centered principles are categorized into four domains as shown in Table 1. These categories group the principles into research-validated domains important to learning: metacognitive and cognitive factors, affective and motivational factors, developmental and social factors, and individual difference factors. An understanding of these domains and the principles within them establishes a framework for designing learner-centered practices at all levels of schooling. It also helps define what "learner-centered" means from a research-validated perspective.

Defining "Learner-Centered"

From an integrated and holistic look at the Principles, the following definition emerges:

"Learner centered" is the perspective that couples a focus on individual learners - their heredity, experiences, perspectives, backgrounds, talents, interests, capacities, and needs - with a focus on leaning - the best available knowledge about learning and how it occurs and about teaching practices that are most effective in promoting the highest levels of motivation, learning, and achievement for all learners. This dual focus then informs and drives educational decision making. Learner-centered is a reflection in practice of the Learner-Centered Psychological Principles - in the programs, practices, policies, and people that support learning for all.

This definition of learner-centered is thus based on an understanding of the Learner-Centered Psychological Principles as a representation of the current knowledge base on learners and learning. The Principles apply to all learners, in and outside of school, young

Table 1: The Learner-Centered Psychological Principles

COGNITIVE AND METACOGNITIVE FACTORS

Principle 1: Nature of the learning process.
The learning of complex subject matter is most effective when it is an intentional process of constructing meaning from information and experience.

Principle 2: Goals of the learning process.
The successful learner, over time and with support and instructional guidance, can create meaningful, coherent representations of knowledge.

Principle 3: Construction of knowledge.
The successful learner can link new information with existing knowledge in meaningful ways.

Principle 4: Strategic thinking
The successful learner can create and use a repertoire of thinking and reasoning strategies to achieve complex learning goals.

Principle 5: Thinking about thinking
Higher order strategies for selecting and monitoring mental operations facilitate creative and critical thinking.

Principle 6: Context of learning
Learning is influenced by environmental factors, including culture, technology, and instructional practices.

MOTIVATIONAL AND AFFECTIVE FACTORS

Principle 7: Motivational and emotional influences on learning
What and how much is learned is influenced by the learner's motivation. Motivation to learn, in turn, is influenced by the individual's emotional states, beliefs, interests and goals, and habits of thinking.

Principle 8: Intrinsic motivation to learn
The learner's creativity, higher order thinking, and natural curiosity all contribute to motivation to learn.
Intrinsic motivation is stimulated by tasks of optimal novelty and difficulty, relevant to personal interests, and providing for personal choice and control.

Principle 9: Effects of motivation on effort
Acquisition of complex knowledge and skills requires extended learner effort and guided practice. Without learners' motivation to learn, the willingness to exert this effort is unlikely without coercion.

DEVELOPMENTAL AND SOCIAL FACTORS

Principle 10: Developmental influence on learning
As individuals develop, they encounter different opportunities and experience different constraints for learning. Learning is most effective when differential development within and across physical, intellectual, emotional, and social domains is taken into account.

Principle 11: Social influences on learning
Learning is influenced by social interactions, interpersonal relations, and communication with others.

INDIVIDUAL DIFFERENCES FACTORS

Principle 12: Individual differences in learning
Learners have different strategies, approaches, and capabilities for learning that are a function of prior experience and heredity.

Principle 13: Learning and diversity
Learning is most effective when differences in learners' linguistic, cultural, and social backgrounds are taken into account.

Principle 14: Standards and assessment
Setting appropriately high and challenging standards and assessing the learner and learning progress-including diagnostic, process, and outcome assessment-are integral parts of the learning process.

Summarized from the APA Work Group of the Board of Educational Affairs (1997, November). Learner-centered psychological principles: Guidelines for school reform and redesign. Washington, DC: American Psychological Association.

and old. Learner-centered is also related to the beliefs, characteristics, dispositions, and practices of teachers -

practices primarily created by the teacher. When teachers and their practices function from an understanding of the knowledge base delineated in the Principles, they (a) include learners in decisions about how and what they learn and how that learning is assessed; (b) value each learner's unique perspectives; (c) respect and accommodate individual differences in learners' backgrounds, interests, abilities, and experiences; and (d) treat learners as co-creators and partners in the teaching and learning process.

Others who have used the term "learner-centered" (e.g., Darling-Hammond, 1996; Sparks & Hirsh, 1997) refer to learning new beliefs and new visions of practice that are responsive to and respectful of the diverse needs of students and teachers as learners. This means that all learning, including that for students and teachers, must include strategies that support diverse learner needs and perspectives, provide time for critical reflection, and opportunities for teachers to co-create practices with their students that enhance learning, motivation and achievement. For Sparks and Hirsh and others, this view of "learner-centered" is a research-validated paradigm shift that transforms education - including how best to use technology to support the new vision.

Of significance in my own work with learner-centered practices and self-assessment tools based on the Principles for teachers and students in K-12 and college classrooms is the finding that what defines "learner-centeredness" is not solely a function of particular instructional practices or programs (McCombs & Lauer, 1997; McCombs & Whisler, 1997). Rather, it is a complex interaction of qualities of the teacher in combination with characteristics of instructional practices - as perceived by individual learners. That is, "learner-centeredness" is in "the eye of the beholder" and varies as a function of learner perceptions which, in turn, are the result of each learner's prior experiences, self-beliefs, and attitudes about schools and learning as well as their current interests, values, and goals. Thus applications and assessments of educational technology must consider student perceptions that their personal and interpersonal needs are being met.

When learner-centered is defined from a research perspective that includes the knowledge base on both learning and learners, it clarifies what is needed to create positive learning contexts and communities. When this occurs at the classroom and school levels, it increases the likelihood of success for more students and their teachers. In addition, a research-validated foundation that focuses on both learners and learning can lead to increased clarity about the requisite dispositions and characteristics of school personnel who are in service to learners and learning - particularly teachers. One implication is that the learner-centered principles can become a framework for determining how to use and assess the efficacy of technology in providing qualities and characteristics of the most effective teachers.

Using Technology to Provide Qualities of Learner-Centered Teachers

In addition to having certain beliefs about learners and learning, research shows that learner-centered teachers tend to have some general characteristics and dispositions in common. At this year's Association for Educational Communications and Technology (AECT) conference, Fullan (2000) stressed that the more powerful technology becomes, the more indispensable good teachers are. In Fullan's view, teachers are needed who are "pedagogical design experts" and facilitators of learning (Brown, 2000; Ellsworth, 2000). Technology may change some of the traditional teacher roles, but it will also require them to engage in more powerful roles - roles that include not only using technology appropriately such that it opens new pathways to learning not previously available, but also require teachers to find ways to build in meaning, purpose, connections, and relationships to the larger world and community outside the school building.

A helpful guideline is McKeachie's (1995) description of the characteristics of great or "learner-centered" teachers, including: presenting material in interesting ways, stimulating intellectual curiosity, giving clear explanations and quality feedback, being fair and skillful in observing student reactions, being helpful and friendly, and providing clear structure and organization to the materials presented. Nolen (1994) reports that another characteristic shared by learner-centered teachers is their willingness to listen to students and acknowledge their voice. By listening to students it is possible to (a) transform schools to better educate students, (b) understand the sense students are making of the curriculum so as to decide how to change it, (c) understand diverse perspectives that need to be part of the theories of learning and teaching, and (d) demonstrate respect for students. Too often attention is given to what we think are the important variables, only to discover they don't make a difference to student motivation, learning, and achievement. These points apply to the changing role of teachers as learners and how technology is used to support learning and social development.

Those working closely with technology and its impact on learning are increasingly recognizing that the search for the impact of technology cannot be separated from the key role of humans in the process. For example, Yakel and Lamerski (2000) studied 15 school sites and found it was the human networks that enabled the successful integration of technology into schools and the surrounding community through key partnerships, community support, and key people. It was people networking that also brought innovations in technology that benefited both the school and the community. And it was key people who led the changes and impacted technology use. Further, Boyle and Rigg (2000) emphasize that human learning must be the focus, based on the assumption that individuals need opportunities for creative problem solving and voice.

What are Implications of the Learner-Centered Framework for the Application and Assessment of Educational Technology?

The implications of the learner-centered framework fall into the following areas: how educational technology is applied to support learners and learning, how technology can be assessed, how learner-centered learning communities can be established, and how we can expand the notion of collaboration and transform the educational system.

Applications of Technology to Support Learners and Learning

As suggested in the learner-centered framework, learners must be supported in their diverse needs and capacities. We know from the research-validated Principles (see Table 1) that there are major categories of factors within all learners that influence learning. When educators and instructional designers understand these factors, the focus is on maximizing natural learning and motivation with instruction that

- is meaningful and relevant from the individual learner's perspective,
- provides appropriate learning challenges and standards,
- accommodates needs to be supported in critical thinking and learning skills,
- attends to the climate and context in which learning occurs,
- honors individual needs for choice and control, that provides for emotional safety,
- supports individual interests and creativity,
- provides positive social interactions and interpersonal relationships, and
- adapts to a variety of individual differences.

In a similar vein but with a focus on learning, Bransford, Brown, and Cocking (1999) suggest that technology can support learning in five ways (p. 195):

- To bring exciting curricula into the classroom that is based on real-world problems and that involves students in finding their own problems, testing ideas, receiving feedback, and working collaboratively with other students or practitioners beyond the school classroom;
- To provide tools and scaffolds that enhance learning, support thinking and problem solving, model activities and guide practice, represent data in different ways, and are part of a coherent and systemic educational approach;
- To give students and teachers more opportunities for feedback, reflection, and revision, including those where students evaluate the quality of their own thinking and products, have opportunities to interact with working scientists, receive feedback from multiple sources which include their peers, and experience cognitive tutors and coaching in areas where improvement is needed;
- To build local and global communities that are inclusive of teachers, administrators, parents, students, practicing scientists, and other interested community people, expanding the learning environment beyond the school walls; and
- To expand opportunities for teacher learning that include helping teachers to think differently about learners and learning, to reduce the barriers between students and teachers as learners, to create new partnerships among students and parents, and to expand communities of learners that support ongoing communication and professional development of teachers.

Beyond these uses, Carroll (2000) has pointed out that highly interactive technologies such as the Internet also make it possible to support both learners and learning in recursive processes of exploration that are non-linear and congruent with natural motivation and learning processes. To support these complex non-linear processes, it is necessary to "think outside the box" of traditional education with its focus on knowledge conservation versus knowledge production. The real assessment issue becomes, as Bransford et al. (1999) and Thornburg (1999) have also recognized, how technology is used and its match or mismatch with what learners need, how they best learn, and the thinking and learning skills that should be supported.

Assessment of Technology in Service to Learners and Learning

There is growing agreement that the key evaluation issue is not technology's value as a tool but rather the effective use of this tool in teaching and learning (Burnham, Miller, & Ray, 2000; Rein, 2000). Further, Bennett et al. (2000) argue that the impact of technology on various aspects of teaching and learning can only be understood in the social context of schools. One of the issues recognized by Bransford et al. (1999) is that there is a need for both small- and large-scale studies that evaluate the goals, assumptions, and uses of technology in classrooms and the match or mismatch of these uses with principles of learning and transfer (p. 240). Thus, their argument - similar to the one I have presented here - is that the focus of technology evaluation be on learning and learners and not the technology per se.

With the learner-centered framework (McCombs, 2000), the focus is on:

- The Learner and each learner's perceptions, needs, and motivation;
- Learning Opportunities and the types of teaching and learning experiences that can meet learner needs for success, belonging, and autonomy;
- Learning Outcomes that include affective, cognitive, social, and performance domains; and
- The Learning Context or climate for learning, including expectations, teacher and technology support, time structures, and adaptability to student needs.

The key issues in using educational technology to support learner-centered principles and practices are:

- Building ways to meet learner needs for interpersonal relationships and connections;
- Finding strategies that acknowledge individual differences and the diversity of learner needs, abilities, and interests;
- Tailoring strategies to differing learner needs for personal control and choice; and
- Assessing the efficacy of technology to meet diverse learner needs.

Thus, I would add that not only do we need to look for the match or mismatch of technology uses with learning principles but also its match or mismatch with learners and their diverse needs. We need a balance of personal and technical supports that are provided with technology. Toward this goal, learner-centered assessment strategies are those that:

- Include the perspective of the learner as the one closest to the learning process and outcomes and whose perspective is the best predictor of learning outcomes;
- Build in ways for learners to co-create assessment experiences, thereby developing personal responsibility for their own learning and learning outcomes;
- Collect self-assessment information that informs instructional design and the selection of technology tools that are used to meet learner and learning needs; and
- Include multiple outcome measures and types of outcome categories that include content and skills as well as affective, motivational, and attitudinal outcomes.

The assessment questions of importance within a learner-centered framework are:

1. How is technology perceived by individual learners and teachers relative to its teaching-learning support?
2. What changes in learning and performance outcomes can be observed with different technology uses and with different learners?

3. What changes in teaching processes can be observed that enhance learning outcomes?
4. What changes in the learning context can be observed that create new partnerships and climates for learning?

The data sources that can answer these questions include:

- Student and teacher self-assessments of technology practices and strategies;
- Student and teacher attitudes toward technology and its specific uses;
- Multiple student motivation measures;
- Multiple student achievement measures; and
- Observational information on learning outcomes, teaching, and learning context.

Beyond these implications of the learner-centered framework, however, there are two other important implications: how this framework can (a) help build schools as learner-centered learning communities and (b) expand the notion of collaboration and transform current educational systems. Technology has an obvious role in both of these areas, but it is a role that must evolve from the foundation of research-validated principles and practices.

Building Learner-Centered Learning Communities

Work by Fullan (1995) on systemic educational reform highlights the importance of creating cultures in which people are free to share basic beliefs and values and struggle with bringing these into agreement in a vision for the school. Weinstein (1998) further argues that to accomplish school level changes, it is necessary to help both teachers and students "change their minds" or modify current thinking. One example of such change in thinking is teachers learning to value student perceptions of practice and using negotiation strategies to work collaboratively with their students to define changes in practice and expectations. When beliefs and thinking change, practices and climate change, and student outcomes shift to more positive expectations, higher motivation, increased learning, and higher achievement. This was recently demonstrated in case studies of participants in five urban middle schools, where Fulton and Torney-Purta (2000) found that it was teacher beliefs about teaching and learning and the learning community that was formed that most led to positive benefits of technology.

When applying technology to building learning communities, another consideration is how to contribute to the spirit of vitality of learner-centered schools. This spirit occurs when the culture is committed to learning and change for all learners, including teachers. Technology can be used to create a culture that supports student motivation, learning, and achievement while also supporting teachers' needs to be learners. That means using technology to create networks among teachers that build on their natural commitment to high achievement for all learners and to ongoing learning, change, and continuous improvement. It is important to note that building a culture of learning and change must be built from within the organization. The process must be one that supports continuous evaluation and improvement of the education process at every level (Joyce & Calhoun, 1995). Critical inquiry into ways of helping students learn better must become a normal activity that involves the whole faculty and builds community. An important outcome of facilitating this kind of change from within, as reported Joyce and Calhoun (1995), is that faculty begin to realize that teaching and learning involves a never-ending process of trying to reach all students in the best ways currently known. The vision must be subject to change, the whole system must maintain flexibility and openness to new learning, transformation, and change.

Somewhat more challenging is the use of technology to develop the kind of learning community described by Caine and Caine (1997): a community with shared values, a common agenda, and collegial connections among teachers and students. In healthy learner-centered learning communities, individuals welcome divergent perspectives because they understand that the underlying outcome is learning and change in a context of respect and caring. The learning community that is healthy works for everyone and encourages rather than eliminates diverse perspectives. When different world views and beliefs are held, inclusive dialogue is the process for learning; relationships become the vehicle for change. As Caine and Caine (1997) acknowledge, learning communities facilitate self-organization as a natural process in adaptive, living systems. They meet individual needs for safety and security, and they encourage new relationships and ways of

generating new relationships. In the context of positive relationships and a positive climate for learning, beliefs and assumptions about learning, learners, and teaching can be examined. Active listening, reflection, and critical questioning are tools of the learning dialogue. In addition, Schaps and Lewis (1999) report it is essential to have a dual emphasis on (a) a sense of community and on academic learning and (b) student and teacher thinking and voice in shaping classroom lessons and decisions.

Expanding the Notion of Collaboration and Transforming the Educational System

Providing a context and opportunities for people networking and collaboration is another important feature of learner-centered school cultures that must be addressed in setting up technology-supported learning communities. Fullan (1992-93), for example, highlights the importance of inquiry and collaboration along with technical skills and reflective practices. Collaboration includes sharing, trusting, and support; collaboration is central to daily, joint work and facilitates growth. Working collaboratively, however, often necessitates overcoming problems. These include the problems of overload, isolation, untapped competence and neglected incompetence, narrowness in the teacher's role and administrative resistance to teachers playing leadership roles, poor solutions and failed reform - all of which have a negative impact on morale, motivation, energy, and enthusiasm for change.

Fullan (1997) argues the need for a different premise - one that focuses first on the individual and then moves to the group and organization. Each learner's perspective is a valued and honored medium of learning and a catalyst for learning, change, and improvement in healthy learning communities. These communities must themselves be a model of the processes they want to engender in learners. To produce quality learners, all learners must experience both quality content and processes. As Rudduck, Day, and Wallace (1997) argue, the successful change agenda creates time for dialogue and engages all learners in the process of exploring standards for judging quality. Principles of respect, fairness, autonomy, intellectual challenge, social support, and security guide the standard-setting and implementation process. Time for learning and change are acknowledged and provided for, along with time to share successful practices, experiment, and continually improve.

This takes us to the implications of the learner-centered framework for transforming education and the potential role of technology. Many of those closely associated with the application and assessment of technology in education are recognizing that the current system must be transformed to accommodate the changing needs in our world, our technologies, and what students will need to succeed and help reshape the future. For example, Schank and Jona (1999) see technology as driving educational change by changing the role of teachers, the role for schools, and how curriculum and instruction are developed. Teachers will become co-learners and contributors to the social and interpersonal development of students, counterbalancing the potential of computer technology to lead to personal and social isolation and alienation. Schools will evolve into community centers to further promote student connections to the community around them and to working in groups on real-world projects. The online delivery of education will provide a means to centralize course development and links to academic tutors on a global scale. To support this evolution, Schank and Jona argue that the current focus needs to shift from goal and standard setting to (a) recruiting the best technology experts and designing the best online courses, (b) planning for a vision of school that does not include classrooms, and (c) experimenting with new approaches to schooling that can support anytime, anywhere learning.

Whether technology becomes the primary delivery system for the educational system of the future or whether it is one of the major tools used in the teaching and learning process will require collaborative planning by all constituents involved. This includes students, parents, teachers, administrators, community members, and policymakers at local and national levels. By using the best knowledge available on how people learn, what enhances learning and motivation for diverse learners, and how best to support learning and change in inclusive and respectful dialogue - I have every confidence the best answers will emerge. And from a learner-centered perspective, they won't be the same answers for all learners and all learning communities. With technology, therefore, comes the promise of providing the tools and capacity for networked learning communities that can expand and transform notions of learning and schooling in ways that produce healthy and productive lifelong learners.

The learner-centered framework adds a constant reminder that the human element cannot be left out of even the most advanced technology-supported networked learning communities. Beyond that, it must be recognized

that one of the biggest factors to the success of information technologies in learning, following people, is the context of safety and support for learning that is established. As reported by Green and Staley (2000), technologies such as computer conferencing can provide an effective learning tool if they attend to constructing a safe context and interpersonal rapport. And that is our challenge - how to design educational systems where technology is in service to, values, and supports diverse learners and learning contexts. When that goal is embraced, the evaluation question will then be a much different one. I suggest that it will be one centered on understanding how technology can contribute to individual growth and development against personalized learning goals that derive from shared visions for learning in the larger learning community and society. Assessment methodologies will be those that support non-linear learning and match natural learning and motivation processes that occur in life. Rather than assessing the benefits of technology, the focus of technology assessment will be to explore how to enhance those benefits by matching them to learner needs combined with information on how learning best occurs.

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with Nadine Lambert, entitled "How Students Learn: Reforming Schools through Learner-Centered Education", was published by the American Psychological Association in January 1998 and contains a collection of chapters that provide the research base for learner-centered practices at the school and classroom levels. In addition, she helped create a video-supported program. And Learning for All, to inspire a new vision of American education and bring information and useful strategies related to effective learner-centered practice to school administrators, teachers, parents, and school boards. Finally, she has developed a CD-ROM supported education program, entitled The Sun's Joules, for the Department of Energy and National Renewable Energy Laboratory on the topic of renewable energy for middle and high school students. This problem-based, learner-centered, standards-based, and interdisciplinary program includes a Teacher Guide with examples of learning activities and units for teachers to build upon in their own lessons, Facilitator Manual for supporting a two-day workshop on program implementation, and a Standards Reference Document of Colorado and national standards for mapping program content to local standards.

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